

Claims

1. A protective device for protecting an interface means (2,3) of the type hereinbefore defined of a read and/or write unit of the type hereinbefore defined, the read and/or write unit comprising a receiving area for receiving a data carrier, the interface means (2,3) being located in or adjacent the receiving area for interfacing with the data carrier for reading from and/or writing to the data carrier, characterised in that the protective device (1,20,30) comprises a carrier means (5) for engaging in the receiving area of the read and/or write unit, and a protecting means (6) carried on the carrier means (5) for engaging the interface means (2,3) for protecting the interface means (2,3) when the carrier means (5) is engaged in the receiving area.
2. A protective device as claimed in Claim 1 characterised in that the protecting means (6) is located on the carrier means (5) at a position which when the carrier means (5) is located in the receiving area coincides with an inoperative position of the interface means (2,3), and/or a position at which the interface means expects to find directory and/or other data on a data carrier.
3. A protective device as claimed in Claim 1 or 2 characterised in that the protecting means (6) engages the interface means (2,3) with a portion of the interface means (3,7) nested into the protecting means (6).
4. A protective device as claimed in Claim 3 characterised in that the area of the protecting means (6) offered up to the interface means (2,3) is at least of area similar to the area of the portion (3,7) of the interface means (2,3) to be nested into the protecting means (6).
5. A protective device as claimed in Claim 3 or 4 characterised in that the area of the protecting means (6) offered up to the interface means (2,3) is greater than the area of the portion (3,7) of the interface means (2,3) to be nested into the protecting means (6).
6. A protective device as claimed in any of Claims 3 to 5 characterised in that the area of the protecting means (6) offered up to the interface means (2,3) is such

that the protecting means (6) embraces a peripheral portion (7) extending around the portion (3) of the interface means (2,3) to be nested into the protecting means (6).

7. A protective device as claimed in any preceding claim characterised in that the protecting means (6) is resilient.

8. A protective device as claimed in any preceding claim characterised in that the protecting means (6) comprises a plurality of fibres (15) extending from the carrier means (5) for engaging the interface means (2,3).

9. A protective device as claimed in Claim 8 characterised in that the fibres (15) of the protecting means (6) are flexible.

10. A protective device as claimed in Claim 8 or 9 characterised in that the fibres (15) of the protective device (6) are resilient.

11. A protective device as claimed in any of Claims 8 to 10 characterised in that the fibres (15) of the protecting means (6) are provided in the form of a brush (6).

12. A protective device as claimed in any of Claims 8 to 11 characterised in that the fibres (15) of the protecting means (6) extend from a base member (14) mounted on the carrier means (5).

13. A protective device as claimed in Claim 12 characterised in that a resilient mounting means (21) is provided for resiliently mounting the base member (14) of the protecting means (6) to the carrier means (5).

14. A protective device as claimed in any preceding claim characterised in that the carrier means (5) defines a central axis (9) for in use coinciding with a rotational axis of a data carrier in the receiving area.

15. A protective device as claimed in any of Claims 8 to 14 characterised in that the carrier means (5) defines a carrier plane, and the fibres (15) of the protecting

means (6) extend from the carrier means (5) at an angle to the carrier plane of less than 90°.

16. A protective device as claimed in Claim 15 characterised in that the fibres (15) of the protecting means (6) extend from the carrier means (5) at an angle to the carrier plane in the range of 20° to 80°.

17. A protective device as claimed in Claim 16 characterised in that the fibres (15) of the protecting means (6) extend from the carrier means (5) at an angle to the carrier plane in the range of 50° to 80°.

18. A protective device as claimed in any of Claims 15 to 17 characterised in that the fibres (15) of the protecting means (6) extend from the carrier means (5) in a direction circumferentially relative to the central axis (9) defined by the carrier means (5).

19. A protective device as claimed in any of Claims 14 to 18 characterised in that the protecting means (6) extends circumferentially around the central axis (9) defined by the carrier means (5).

20. A protective device as claimed in Claim 19 characterised in that the protecting means (6) extends completely around the central axis (9) defined by the carrier means (5).

21. A protective device as claimed in any of Claims 14 to 20 characterised in that the protecting means (6) is spaced apart from the central axis (9) defined by the carrier means (5).

22. A protective device as claimed in any preceding claim characterised in that the protecting means (6) protects the interface means (2,3) from dirt and dust.

23. A protective device as claimed in any preceding claim characterised in that the protecting means (6) protects the interface means (2,3) from shock.

24. A protective device as claimed in any preceding claim characterised in that an indicating means (12) is provided for indicating the direction in which the carrier means (5) is to be inserted in the receiving area of the read and/or write unit.
25. A protective device as claimed in Claim 24 characterised in that the indicating means (12) is provided on the carrier means (5).
26. A protective device as claimed in Claim 24 or 25 characterised in that the indicating means (12) facilitates alignment of the protecting means (6) with the interface means (2,3).
27. A protective device as claimed in any preceding claim characterised in that the protecting means (6) is located on the carrier means (5) for cleaning the interface means (2,3) as the carrier means (5) is being inserted in the receiving area.
28. A protective device as claimed in any preceding claim characterised in that the protecting means (6) is located on the carrier means (5) for cleaning the interface means (2,3) when the read/write unit is activated for reading or writing data, and the interface means (2,3) is being initially moved for identifying data.
29. A protective device as claimed in any preceding claim characterised in that the carrier means (5) is provided for engaging in a disc receiving area of a disc drive read and/or write unit, and the protecting means (6) is provided for protecting a read and/or write head forming the interface means (2,3) of the read and/or write unit.
30. A protective device as claimed in Claim 29 characterised in that the protecting means (6) cleans the read and/or write head (2,3) of the disc drive read and/or write unit as the read and/or write head (2,3) is being initially moved for identifying data.
31. A protective device as claimed in Claim 30 characterised in that the protecting means (6) cleans the read and/or write head of the disc drive read and/or

write unit as the read and/or write head is being moved substantially perpendicularly relative to the carrier means (5) into and out of the protecting means (6).

32. A protective device as claimed in any of Claims 29 to 31 characterised in that the protecting means (6) is for protecting a read and/or write head provided by an optical head (2,3).

33. A protective device as claimed in Claim 32 characterised in that the protecting means (6) is for engaging a lens (3) of the read and/or write optical head (2).

34. A protective device as claimed in any of Claims 29 to 31 characterised in that the protecting means (6) is for protecting a read and/or write head provided by a magnetic head (2,3).

35. A method for protecting an interface means (2,3) of the type hereinbefore defined of a read and/or write unit of the type hereinbefore defined in which the read and/or write unit comprises a receiving area for receiving a data carrier, and the interface means (2,3) is located in or adjacent the receiving area, the method comprising the steps of inserting a carrier means (5) having a protecting means (6) mounted thereon into the receiving area of the read and/or write unit, and engaging the protecting means (6) with the interface means (2,3) when the carrier means (5) is engaged in the receiving area for protecting the interface means (2,3).

36. A method as claimed in Claim 35 characterised in that the protecting means (6) protects the interface means (2,3) from dirt and/or dust.

37. A method as claimed in Claim 35 or 36 characterised in that the protecting means (6) protects the interface means (2,3) from shock.

38. A method as claimed in any of Claims 35 to 37 characterised in that the protecting means (6) cleans the interface means (2,3) as the carrier means (5) is being inserted into the receiving area.

39. A method as claimed in any of Claims 35 to 38 characterised in that the protecting means (6) cleans the interface means (2,3) when the interface means (2,3) has been activated to identify data.

40. A method as claimed in any of Claims 35 to 39 characterised in that the protecting means (6) cleans the interface means (2,3) when the interface means (2,3) is being initially moved perpendicularly relative to the carrier means (5) into and out of the protecting means (6) for identifying data.

41. A method for protecting an interface means (2,3) of the type hereinbefore defined of a read and/or write unit of the type hereinbefore defined in which the read and/or write unit comprises a receiving area for receiving a data carrier, and an interface means (2,3) is located in or adjacent the receiving area, the method comprising the steps of inserting the carrier means (5) of the protective device (1,20,30) as claimed in any of Claims 1 to 34 into the receiving area of the read and/or write unit, and engaging the protecting means (6) with the interface means (2,3) when the carrier means (5) is inserted in the receiving area for protecting the interface means (2,3).

42. A method as claimed in Claim 41 characterised in that the read and/or write unit is a disc drive read and/or write unit, and the interface means (2,3) is a read and/or write head.

43. A method as claimed in Claim 42 characterised in that the read and/or write head (2,3) is an optical head (2).

44. A method as claimed in Claim 42 characterised in that the read and/or write head (2,3) is a magnetic head.

45. A method as claimed in any of Claims 41 to 44 characterised in that the method further comprises activating the read and/or write unit for causing the interface means (2,3) to cycle perpendicularly relative to a plane defined by the

carrier means (5) for cycling the interface means into and out of the protecting means (6) for cleaning the interface means (2,3).

46. A cleaning device for protecting an interface means (2,3) of the type hereinbefore defined of a read and/or write unit of the type hereinbefore defined, the read and/or write unit comprising a receiving area for receiving a data carrier, the interface means (2,3) being located in or adjacent the receiving area for interfacing with the data carrier for reading from and/or writing to the data carrier, characterised in that the cleaning device (1,20,30) comprises a carrier means (5) for engaging in the receiving area of the read and/or write unit, and a cleaning means (6) carried on the carrier means (5) for alignment with the interface means (2,3) when the carrier means (5) is located in the receiving area so that movement of the interface means (2,3) when the read and/or write unit is activated for identifying data the interface means (2,3) is moved into and out of the cleaning means (6) for cleaning the interface means (2,3).

47. A method for cleaning an interface means (2,3) of the type hereinbefore defined of a read and/or write unit of the type hereinbefore defined in which the read and/or write unit comprises a receiving area for receiving a data carrier, and the interface means (2,3) is located in or adjacent the receiving area, the method comprising the steps of inserting a carrier means (5) having a cleaning means (6) mounted thereon into the receiving area of the read and/or write unit with the cleaning means (6) aligned with the interface means (2,3) when the carrier means (5) is engaged in the receiving area, and activating the read and/or write unit for causing the interface means (2,3) to move relative into and out of the cleaning means (6) for identifying data for cleaning the interface means (2,3).

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